A considerable space is devoted to a consideration of the reduction phenomena which form such a striking feature in the cellular life-cycle of the great majority of animals and plants. But we cannot forbear from protesting against the introduction of what seems to us to be a totally unjustifiable confusion into current terminology. The term "meiotic phase," used to cover the processes connected with "reduction," was introduced to embrace the *two* mitoses which are intimately connected. In the course of the first of these the reduction in the number of the chromosomes is accomplished. Mr. Walker, however, speaks of the second meiotic division as post-meiotic, thus obscuring the close relationship that exists between the heterotype and homotype division, a relationship that is, partly at least, due to the fact that in the prophase of the first meiotic (heterotype) division, a fission in the chromosome rudiments takes place which will be consummated during the *second* (homotype) mitosis; this explains the common, though not invariable, absence of the spireme from the second division, and probably is connected with the rapidity with which the two mitoses usually follow on each other. The term post-meiotic should be (as it hitherto has been) reserved for those mitoses, if any, which occur after the completion of the meiotic phase.

The description given of polar bodies is made, doubtless by inadvertence, to read as though these structures only represented nuclei and not cells, whereas, of course, they are each severally homologous with the egg.

The book would be improved by the substitution of a more comprehensive account of the nuclei of the lower organisms for the matter contained in chapters x. and xi., which seems to us to be somewhat out of place in a work of this kind, as well as open to criticism on other grounds.

The addition of an introductory chapter dealing with the development of our knowledge of the cell, and the recognition of its paramount importance, would be useful when there is a demand for a second edition, and at the same time the references which appear at the foot of some of the pages might also be completed.

We have criticised the work somewhat frankly, perhaps, but this has been done not with the intention of condemning it. On the contrary, it possesses many very good qualities, and with some little modification and correction, it will easily rank as an extremely useful text-book of elementary cytology. J. B. F.

Immune Sera. By Dr. C. F. Bolduan. Second edition, re-written. Pp. viii+154. (New York: John Wiley and Sons; London: Chapman and Hall, Ltd., 1907.) Price 6*s.* 6*d.* net.

THIS book has its origin in a monograph by Wasserman, a translation of which was published by the author in 1904. This second edition has been re-written by the translator. The original chapters are dealt with more fully, and the scope of the book has been widened by the addition of chapters on venins and antivenins, agglutinins, opsonins, and serum-sickness.

The antitoxins are first dealt with, and brief outlines are given of the history of the subject and of the methods of preparing and testing antitoxins. Ehrlich's views on the origin of antitoxin, on the constitution of diphtheria antitoxin, and on the nature of the combination between toxin and antitoxin, are treated in a lucid manner. The views of Arrhenius and of Bordet receive less adequate treatment.

In handling the subject of the agglutinins, the bacteriolysins, the hæmolysins, and the precipitins, much discrimination has been shown in avoiding a discussion of the more difficult theoretical considerations, and in selecting the fundamental facts and experiments for exposition.

A good account is given of the application of hæmolytic and precipitin methods to practical purposes. Among these may be mentioned methods of great importance in medico-legal work, viz., the biological tests for bloodstains by means of which it is possible to differentiate human blood from the blood of other animals.

The least satisfactory chapters in the book are those on serum sickness, snake venoms, and opsonins. In regard to the last, the author states that the results obtained by most workers in America fail to bear out Wright's claims for his method.

On the whole, this is an excellent little book, and ought to be of service both to those who wish to keep abreast of the main advances in the subject and to those who are attacking these questions for the first time.

A Guide to the Study of Australian Butterflies. By W. J. Rainbow. Pp. 272; illustrated. (Melbourne: T. C. Lothian, 1907.) Price 3*s.* 6*d.*

THIS is a useful little book intended for beginners taking up the study of Australian butterflies, with special reference to their life-history. Indeed, the author not only tells us in his preface that "much of the material in the way of life-histories is now published for the first time," but also, "Only those species of which something is known of their life-history are included in the present volume." Surely this last resolution is a double mistake. On the one hand it will be a great disappointment to any collector who meets with one of the purposely omitted species not to be able to discover from this book (perhaps the only one on the subject to be found within hundreds of miles) whether his find is known, or probably new; and, on the other, if attention had been directed to imperfectly known species, it would have largely conduced to efforts being made to supply the deficiencies in our knowledge. The book otherwise, however, seems to be very well executed, and is remarkable for being written almost entirely from Australian sources.

The classification followed is taken from Mr. G. A. Waterhouse's "Catalogue of the Rhopalocera of Australia." The frontispiece represents two handsome species of Delias and two of Papilio, while most of the species mentioned in the book are excellently figured, figures of the earlier stages being frequently added. The introductory chapters deal with transformations, parasites, collecting and preserving, &c., and are also freely illustrated, the figures of wing-neuration on p. 23 being particularly good. Ninety species are included in this little volume, distributed among six families as follows:—Nymphalidæ (sens. lat.), 35; Libytheidæ, 1; Lycinidæ (*sic*), 16; Pieridæ, 12; Papilionidæ, 9; Hesperidæ, 17.

We notice a few peculiarities in the spelling of some of the names, which appear to be not misprints, but intentional, such as *Xenica kluggi*, and Lycinidæ.

W. F. K.

The Theory and Practice of Perspective Drawing. By S. Polak. Pp. viii+184. (London: University Tutorial Press, Ltd., 1907.) Price 5*s.*

THIS volume of the "Organised Science Series" has been specially compiled to meet the requirements of the Board of Education's syllabus in perspective, and covers the ground of both sections A and B of that syllabus with their direct and inverse problems.

The method of treatment adopted by the author is one likely to be very effective in teaching; new principles and processes, as they arise in the natural development of the subject, are illustrated and driven home by the use of models, diagrams, and repeated applications to suitable problems, so that the conscientious student is always fully conversant with the reasons for his geometrical constructions. The very excellent and suggestive questions from the examination papers of the Board of Education for the last five or six years are freely employed, both in the text and as sample test papers, affording a good criterion of progress.

In addition to the ordinary geometrical solids, many familiar objects the forms of which can be dissected into simple geometrical figures are used as examples. After the student has thoroughly mastered the fundamental principles as set forth in part i., he should experience comparatively little difficulty with the three succeeding parts, which extend the subject to lines and planes obliquely situated, to shadows by parallel and divergent rays, and to reflections in horizontal and vertical mirrors. The book will be very acceptable both to teachers and students of this interesting branch of applied geometry.

Strength of Materials. By W. C. Popplewell. Pp. x + 180. (Edinburgh and London: Oliver and Boyd, 1907.)

THIS text-book, which is based on the notes of lectures given by the author to day and evening students at the Manchester Municipal School of Technology, deals with the fundamental principles which must be mastered by every student who wishes to have a sound knowledge of machine and structural design. Special attention has been devoted to the effects of unequal distribution of stress, and in chapter vii. the author gives details of his own experimental work in connection with this branch of the subject. The last three chapters give an account of the methods adopted and appliances required in making tests of the various materials used in constructional work, and the important subjects of limit of elasticity and of the influence of previous loading, &c., upon the limit are discussed. In an appendix is given a table of strengths and weights of a large number of different materials, and there is a collection of useful examination questions for each chapter.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. *No notice is taken of anonymous communications.]*

Lithium in Radio-active Minerals.

THE recent results of Mlle. Gleditsch (*Comptes rendus*, cxlvi., p. 331) corroborating those of Prof. McCoy, viz. that lithium is generally, but not always, a constituent of radio-active minerals containing copper, and that there is no fixed proportionality between the copper and the lithium in these minerals, must not be taken to have the exclusive significance which their authors attribute to them. As explained in our original communication to the Chemical Society, we are inclined to believe that sodium, and perhaps also potassium, are products of the degradation of copper salts when in contact with radium emanation. As both these metals are constituents of ordinary glass, and as the experiments were carried out in glass vessels, the only argument which was used was that the weight of the residue from the treated was greater than that from the untreated copper salt. Lithium was mentioned because it is an unlikely constituent of dust, glass, copper, &c., which were tested specially to prove its absence; it was certainly contained in the treated residue. Inasmuch as the emanation in contact with water yields neon, on the probable supposition that monatomic gases are produced from the emanation, it would follow that the production of any particular one is dependent on surrounding conditions. It will be remembered that the gases from the action of the emanation on a solution of copper sulphate contained no helium, but probably argon. As sodium and potassium are much more widely distributed than lithium, it is more likely that they are the chief products from copper, and that some modifying circumstance has determined the formation of a trace of lithium. Experiments now in progress in silica vessels will settle this point. Numerous chemical analogies might be adduced in favour of this view. For example, the action of bleaching powder on ammonia solution is to give nitrogen for the most part; if much ammonia be present, and if glue or some other colloid be present, hydrazine is the chief product. One can only be guided by such analogies in determining the lines of future experiments.

W. RAMSAY.

Formation of Ground-ice.

IN Canada we have made an extended study of the formation of ground-ice, or anchor-ice as it is called here, and consequently I was interested to see a letter in NATURE of January 30 from Mr. Hampson asking for information as to its origin.

May I at the outset refer Mr. Hampson to four papers published many years ago which are wonderfully interesting to anyone studying the formation of ground-ice? Two of the papers appeared in the *Edinburgh New Philosophical Journal*, one by M. Arago, vol. xv., p. 123, 1833, and the other by the Rev. Mr. Eisdale, vol. xvii., p. 167, 1834. The two other papers were published in the *Phil. Trans.*, vol. cxxv., p. 329, 1835, and vol. cxxxi., p. 37, 1841, by the Rev. James Farquharson, of Alford.

In reply to the questions raised by Mr. Hampson, I may say that (1) the essential conditions for the formation of ground-ice on the bed of a river are clear weather conditions at night with the water at or near the freezing point, excessively low air temperatures by day, with no sunshine and no surface ice or other cover such as overhanging weeds or a bridge to check the nocturnal radiations. The answer to (2) is covered by the above. (3) A flowing river becomes stirred by eddy currents, and hence the cold surface layers find their way to the bottom. We notice many of our large rivers flow with a rolling motion. (4) The water is such a bad conductor of heat that it is only by the mechanical action that the bed of a river becomes cold enough to form ice on it when aided by radiation, or, as I have shown, by a slight supercooling in the water. (5) Ground-ice will form in water of any degree of agitation provided either or both of the causes mentioned in (4) are operating. In the case Mr. Hampson cites of the mill, I should say the heat generated by the water flowing through the mill would tend to prevent the formation of ice on the lower side.

In Canada we have anchor-ice formed in very large quantities in all the waterways flowing too swiftly for surface-ice to form. In some parts of the St. Lawrence it grows 5 feet or 6 feet in depth, forming very rapidly during the periods of intense cold and clear nights. On bright days the sun's radiant heat brings large quantities of it to the surface with much noise and disturbance. The buoyancy of large masses of the ice is often great enough to raise huge stones and boulders and carry them along in the current, depositing by this means portions of the river bed further down stream in the quieter waters. Boatmen are very careful not to cross the river when anchor-ice is rising, for fear of having a large mass come up under them and carry the boat helpless into the rapids. Under surface-ice, with its covering of opaque snow crystals, anchor-ice does not form, and hence it causes no trouble under these conditions.

Anchor-ice is known and studied in every country in the world where ice is formed, and there is much that might be written about it. In NATURE of January 17, 1907, a careful review of my book on "Ice Formation," with special reference to anchor-ice and frazil, was given, and may help to answer some of the questions in the "long list" mentioned by Mr. Hampson. My paper read